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In the Words of the Wise

Maxine F. Singer

Continuing SGR's occasional series of conversations about the turbulence in science politics with members of the scientific community experienced in the ways of Washington. The first, with Erich Bloch, former Director of NSF, appeared on Oct. 15.

As President of the Carnegie Institution of Washington since 1988, Maxine F. Singer heads an elite research organization that operates laboratories for plant biology (Stanford, California), embryology (Baltimore), terrestrial magnetism and geophysics (Washington, DC), plus observatories in Pasadena, California, and Las Campanas, Chile. A laboratory chief at the National Cancer Institute from 1980-87, Singer, a biochemist, conducts research there two days a week as a Scientist Emeritus. Singer is one of the very few women in the National Academy of Sciences and has served on the NAS Council, as well as on many of the government and private committees that shape the politics of science. Singer spoke with SGR Editor Greenberg on November 22. Following is the text, transcribed and edited by SGR.

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SGR. *Many people feel that the Clinton Administration has paid lip service to science but not much more.*

Singer. I agree. For me, a very telling fact was right at the beginning of the Clinton Administration, when the President went off to that Renaissance Weekend [a gathering of Clinton cronies]. And various newspapers and magazines had lists of the people who had been attending this, and they were essentially the society and the culture of the President. There wasn't a scientist, there wasn't an engineer. So, it was clear that throughout his adult life, he had made no connections in the scientific community, and that science was marginal to the way he thought about the country and government. I don't think that's changed. I don't think he's made a real effort, and I think "lip service" is exactly right. That's what you get.

Harold Varmus [Director of the National Institutes of Health] was very pleased that the President came out to NIH not long ago and said all the right things. But there's no indication that there's real substance behind that. I suspect that if you pushed him, you would find that he doesn't really have more than the most superficial concept of what and how science contributes to society.

SGR. *He has designated the Vice President to be largely responsible for science and technology.*

Singer. That designation and the words that went with it, which imply that the Vice President understands science, was

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Science Academy Offers Plan For Coping With Austerity

The chieftains of the science establishment used to appeal regularly to politics for more money, assuring their paymasters that the returns would more than cover the costs and provide innumerable benefits.

Whatever it's validity, that kind of talk was losing attention in Washington even before the Republican Revolution and the Clinton emulation. Now it's gone, interred in a report issued November 29, *Allocating Federal Funds for Science and Technology*, produced by a committee of senior statesmen and women of science, gathered by the National Academy of Sciences.

The committee, chaired by Frank Press, retired President of the Academy, offers a gloomy appraisal of financial

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In Brief

The friends of science on Capitol Hill are seething over what they regard as a new affront from the White House—a Nov. 24 letter from Chief of Staff Leon Panetta to Senate Majority Leader Bob Dole spelling out the President's "key priorities" for the budget negotiations now under way. Medicare, "tax fairness," education, welfare reform, agriculture, defense, and veterans make the list. There's no mention of science, and only a vague reference to technology.

The odds for survival of the Commerce Department have improved a bit. Though the House voted to wipe it out, the Senate balked and the termination provision is not included in a conference report. The situation is among the more confusing in Congress, since the House, while voting to terminate the Department, has also approved funds to keep it going through this fiscal year.

Federal and industrial R&D spending totaled $166 billion in 1993 and half of that money was spent in six states—California, New York, Michigan, New Jersey, Massachusetts, and Pennsylvania, according to a new report from NSF: Data Brief No. 14, free from: NSF, Division of Science Resources Studies, Arlington, Va. 22230; tel. 703/306-1773; fax 703/644-4278.

Scripture and poetry selected by Chairman Robert Walker, carved in gilt letters 2 inches high, now grace a wall of the main hearing room of the House Science Committee. From Tennyson, "For I dipped into the future, far as human eyes could see...." And Proverbs 29:18, "Where there is no vision, the people perish." Given what goes on in that hearing room, more appropriate might be Proverbs 18:2, "A fool takes no pleasure in understanding, but only in expressing his opinion."

. . . A Comprehensive S&T Budget Recommended

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prospects , noting that $2 billion was rescinded last year from previously appropriated federal research and development funds. Adding that "much larger cuts" are in the works this year, the report states that "pressures on federal discretionary spending make further cuts in future years likely."

What should be done to maintain the research enterprise in these shrinking circumstances? Press and colleagues offered a number of ideas, none revenue-producing, earthshaking, or novel, except for their underlying financial pessimism. They said the government should retain the present diversity of agencies supporting S&T, but should attempt to orchestrate their activities through a comprehensive S&T budget that the President would draw up, "including areas of increased and reduced emphasis"—none specified.

Allocating Federal Funds for Science and Technology (97 pp., $27, plus $4 for shipping), order from: National Academy Press, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 202/334-3313 or 1-800/624-6242.

And it was proposed that Congress review the S&T budget as a whole before dispersing the parts to various committees, an idea that's been knocking around Capitol Hill for decades, without success.

The committee also called for reworking the definitions in the federal budget to sift S&T from design work, testing and other activities that are bunched together with all federal support of research and development. The grand total for R&D is now stated to be approximately $70 billion. But by the standard of seeking new knowledge, the S&T activities total $35 billion to $40 billion, the committee stated.

Describing the S&T funds as "large and diverse," the report added that "it is possible within that budget to reduce some programs, eliminate others, increase support of high-opportunity fields, and restrain federal spending—all while maintaining our nation's tradition of excellence in science and technology."

The report recommends a high priority for research in universities, citing their "flexibility and inherent quality control and because they directly link research to education and training in science and education." But perhaps reflecting the institutional diversity of the committee, which started with 18 members, drawn from academe, industry, and government, the report states: "The committee does not presume that academic research is always of higher quality than that conducted in industry, federal laboratories, or other non-academic institutions."

The report will probably serve more as a landmark in the thinking of the scientific elite, rather than as a driver of government policy, since it was commissioned last year, when the Democrats still controlled Congress. The moving force was Senator Tom Harkin (D-Iowa), then Chairman of the Appropriations Subcommittee for NIH, and a great booster of biomedical research. Concerned about NIH's financial doldrums, Harkin earmarked $750,000 for a study focused on missed opportunities in medical research, with a passing reference to "other," unnamed federal agencies.

Harkin, who still proposes bigger budgets for NIH, was obviously seeking ammunition for the money battles on Capitol Hill. His staff, wise in the ways of Academy report writing, included an unusual provision in the specifications for the report. In a memo to the Academy, they stated that the "study should not conclude that the answer to the problem is just to increase funding for research and development. The study *must* focus," the Senate directive stated, "on shifting the balance within existing levels of funding."

That prescription is subject to various interpretations—none of which led the Academy committee to come forth with a kill list of nonsense in federal support of S&T. Regarding termination of antiquated federal laboratories, the committee waffles about and finally suggests, as a "last resort," something akin to the Pentagon's base-closing commission.

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OSTP Is Not Enthused

The Academy's proposals for revamping the federal R&D system drew a quick and chilly response from the White House Office of Science and Technology Policy, which is deep in battle against Republican budget cuts and not inclined to agree that the Clinton Administration's management of research needs fixing.

On hand at the Academy's press briefing on the report was an OSTP staffer handing out a statement from OSTP Director John Gibbons. The goals espoused by the Academy, stated Gibbons, are manifested in the National Science and Technology Council created by Clinton two years ago, as well as in emphasis on priority setting and "strong research budgets."

Gibbons added that "careful examination of the Administration's diverse science and technology programs" show that the Administration is fully committed to academic research, "judicious R&D partnerships with industry," and an "integrated approach" to funding.

Editor and Publisher **Daniel S. Greenberg**
Associate Publisher **Wanda J. Reif**
Circulation Manager **Glen D. Grant**

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. . . Space Station Backed by a 'Stacked' Committee

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one of the more discouraging things that the President said. It's true that Vice President Gore has made a tremendous effort and is dedicated to issues of the environment, which certainly are related to scientific questions. But looking at the things he's written suggests that he's come to that appreciation sort of top down, and that his interest in the environment is focused more on political things, on activities for amelioration, which are not necessarily supported by scientific knowledge. I don't take that, with apologies to the Vice President, as very encouraging at all.

SGR. *The President is served by a Science Advisor and a Committee of Science and Technology Advisors. Nevertheless, the same concerns that existed at the outset of this Administration are, if anything, even bigger now.*

Singer. I think we could have expected that Jack Gibbons [the President's Assistant for Science and Technology] would have been given the chance to be more of an educator, to play a real role in things at the White House. I think it's sad that he hasn't, because he's a very serious, extremely smart person who could have done that, but he didn't have a chance.

SGR. *You don't feel that the science office has achieved influence in the White House and beyond?*

Singer. It doesn't appear to have. And certainly not in the Congress. What was the first thing that the Congress did? It got rid of the OTA [Office of Technology Assessment]. It's arguing about all the rest of everything, but they didn't even argue about that. It just went out the door right in the very beginning of this session of Congress. Both in the Executive and in the Legislature, we're left with this tremendous hole.

SGR. *Then where is the influence in science-policy?*

Singer. One of the interesting things that's come about is that there's now much more likelihood that people from industry and from science will agree on policy matters than ever in the past. The industrial people have realized how much of an ally science is to them, how critical it is, and how that whole area, both from their point of view and from the research point of view, is not being taken care of.

One of the saddest examples is the Space Station. That's an example of doing things for political reasons, not for scientific or economic ones. That's going to get us nowhere. It's going to be applying old technology to do something that nobody wants to do, that has very little point to do.

SGR. *[NASA Administrator] Dan Goldin says the Space Station is going to be a great scientific research instrument. And he stresses that the National Academy of Sciences has endorsed the station for micro-gravity research [SGR, November 1, interview with Goldin].*

Singer. I told Dan Goldin this, so I can tell you and he won't be surprised. If you ask them who wrote that report, the answer is that the National Research Council [of the National Academy of Sciences] got people who know about space research. Those are the people who get funded by NASA. What did you expect? They didn't put people who are not funded by NASA on [the committee]. They put people who already bought into that community. They're good, honest people, but they can't possibly be unbiased.

SGR. *You're saying it was a stacked committee.*

Singer. In a very real sense.

SGR. *The Academy says it's on guard against such bias.*

Singer. Sure, they diversify to research people, and to industrial people, and to people from different geographic areas, and so forth. But everybody on that committee had something to do with the space program, and you don't see them list in the report how much in grants each member gets from NASA. And I would like to know that. Nobody will be happy reading that in your publication, but I really believe that's true, and I told Dan Goldin: Don't take people who have made their careers doing what's called space biology and ask them whether you should build the Space Station. Of course, they're going to say that.

SGR. *You and others see the Space Station as a squandering of resources. Nonetheless, we're going ahead with it.*

Singer. Right. If you try to make a score for projects, you score the kind of science you might expect to get, or the new technological developments, and you certainly also score the training for young people. I don't see that the Space Station is going to give you any of those. The science is mainly biology now. Some of it is directed toward the physiology and health of people in space. For what? We're not about to send anybody to Mars in the foreseeable future. We don't need to

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Academy Report

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The report heads for safe ground, too, on the politically volatile question of the appropriate federal role in industrial technology, the subject of one of the nastiest controversies now going on between the White House and Congress. "The government should not subsidize specific private firms for projects that they would undertake anyway," the committee states, without risk of contradiction. But, it adds, there may be occasions where government assistance is appropriate.

As a product spawned under the old regime, the Academy report is not likely to gain high regard among Republicans on Capitol Hill. It surely will not go over well with Chairman Robert Walker of the House Science Committee, who aims to go down in history as the legislative daddy of a US Department of Science.

While acknowledging that the departmental issue is "beyond the charge to this committee," the report says a department can't orchestrate the federal R&D system. Walker issued a statement calling the report "useful."

The report's most durable contribution may be words that provide an epitaph for the good old days: "The research and development system is conditioned on growth and is now challenged by the new environment that requires downsizing of both missions and budgets."

. . . Doubts NASA Claims of Close Ties with NIH

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do any of that right now. And the rest of it is this microgravity stuff—growing crystals and things. And it's never clear why. If you want to develop industrial processes, are you really going to do them up there? Nobody will be able to afford to pay for what you make up there. In terms of basic biology, you can't repeat the experiments. The experiments are planned years ahead. So, there are so many things wrong with it.

SGR. *Why haven't these sentiments influenced policy?*

Singer. In making the decisions, the scientific arguments play a very small role. I don't say they play no role. And I understand that in making decisions there are political considerations, and economic and scientific ones. There is no question but that the Space Station makes jobs in lots of different parts of the country. From a political standpoint, it appears as a very desirable thing. The real question in my mind is why don't the people in Congress understand that there are also science jobs in every Congressional district. If your university goes to the Congressman's office and says there are so many jobs here, come and visit this university—that's the kind of thing that needs to go on, and it's only just beginning. I think we need to put it on the local level. And probably if you began adding it up, you would see that the contributions to particular Congressional districts are quite large, and perhaps even competitive with the Space Station.

SGR. *Goldin says NASA is developing close relations with NIH to benefit from NIH's peer-review capacity.*

Singer. That was announced at a time when they were looking for ways to defend the Space Station and the biology that was going to go on. I have never seen anywhere anything written about the substance of that connection. I'm doubtful.

SGR. *What happened to the famed NIH of yesteryear?*

Singer. It grew. It became bureaucratized, and the people who were there grew older. I was in one of the first groups that went to the NIH, in 1956. We're all 40 years older now and in general the strength of scientific institutions is very much tied to the influx of excellent young people.

SGR. *Why didn't excellent young people come in?*

Singer. Excellent people did come in as it was growing through the 60's, and then you had the problem of any institution, where you have to stop growing but you have an investment and commitments to people, and it's very hard to make for a changeover. As institutions get larger, they get more bureaucratic, they get a tremendous increase in regulations, all of which are perhaps useful, but they've added up. And so the NIH has gotten to be stuffy. There are people who are concerned with their own shops and not necessarily with the quality of what's going on.

In the last few years, several very good committees have pulled no punches about what was wrong and what needs to be done. And there are enormous changes going on there. As those changes are brought, you begin to see the way a bureaucracy resists changes. The changes get made, but everything tends to stay sort of the same. But Varmus and [Richard] Klausner [Director of the National Cancer Institute] are very much aware of this, and are really trying very hard to turn things over, and I think they will.

Really hopeful things are going on at NIH. The whole system by which you appoint people to permanent scientific positions has changed. It is now well defined, instead of sloppy. And it's designed in a way so that it's much more difficult for, say, someone like me to be sure that my favorite postdoc gets a permanent job in which he will simply do what I want him to do, which went on a lot. That means that you had a lot of people who were not first rate, who hadn't demonstrated really independent, original research. Now you have to do that in order eventually to get a permanent job. In time, we should have many fewer people around who got their jobs because a powerful mentor wanted them to come and serve their own interests. In the end, the excellence depends on a lot of independent excellent people.

It used to be that if there was a job opening, there was a cursory attempt at making a recruitment public. But everybody knew that the job was already given to somebody. Now there's open recruitment that's monitored by a committee of first-rate scientists from across the institutes. In addition, they are tightening up on the intramural review processes. The review processes within NIH were subject to a lot of cronyism. Now there will be less cronyism and there will be more followup on the reviews. You can't fire anybody, but you can reduce resources, you can do a lot of things.

There's a lot going on. There's a lot of resistance to it, as well, as you would expect. Smart people find clever ways to resist. You have to watch what's going on.

SGR. *Science education remains in poor condition.*

Singer. I'm very pleased by the importance being given to science education at the NSF. But a lot of my colleagues are not so happy about that. It takes a lot of money away [from research]. But most scientists need to recognize that they have to pay attention to this issue. They can't just leave it to the people who are the problem and who have made it such a disaster over the years. It's very hard to convince people of my generation of that. There's no question that there are a bunch of senior scientists who think it's beneath them to worry about such things. It's a shame but it's true.

SGR. *Bruce Alberts [President of the National Academy of Sciences] has made science education his top priority.*

Singer. He's not that popular in the Academy because of it. A lot of people just don't understand why he's doing that.

SGR. *The concern is that he seems to worry about science education to the exclusion of other things that Academy presidents were involved with.*

Singer. He has to be that way if he expects to make the slightest dent, because he's got all this resistance in the Academy. His style is very different from his predecessor's. There have been times, particularly during all this talk about

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Huge Declines Forecast for Health-Care Personnel

Citing the rapid spread of managed health-care systems, a private commission with an influential membership says the US faces a major oversupply of physicians and should close down 20-25 percent of the existing 125 medical schools and restrict immigration of foreign-trained doctors. The commission also called for sharp reductions in training of nurses, pharmacists, and other health professionals.

The proposals were made public last month by the Pew Health Professions Commission, an offshoot of the Pew Charitable Trusts. Chaired by Richard D. Lamm, former Governor of Colorado, the Commission consists of 20 members drawn from academe, health-care institutions, insurance organizations, and other segments of the health-care industry.

The Pew recommendations naturally turned attention to the trade association of the nation's medical schools and training hospitals, the Washington-based Association of American Medical Colleges. The AAMC management, of course, cannot endorse elimination of member schools, though it is widely said in medical-education circles that some are teetering near insolvency, will have to go, and might usefully be hastened on their way.

Responding to the Pew report, AAMC President Jordan J. Cohen said the number of foreign graduates admitted to the US should be reduced as a first step. "Limiting opportunities for US citizens to pursue careers in medicine without first addressing the number of IMG [international medical graduates] is inappropriate." Killing off schools before that happens, Cohen added, "is simply misguided public policy."

Critical Challenges: Revitalizing the Health Professions for the 21st Century (83 pp., no charge for one copy; $15 each for more; order from: Pew Health Professions Commission, Center for the Health Professions, University of California, San Francisco, 1388 Sutter St., Suite 805, San Francisco, California 94109; tel. 415/476-8181; fax 415/476-4113.

In taking that stance, the AAMC pointed out, it was reiterating "its decade-old policy position" on the physician workforce. Rarely, it might be noted, does an organization confess so freely to being immobilized, but there it is.

The Pew report is emphatic about closure of schools rather than a broad shrinkage of admissions, cautioning that the "first impulse will be to reduce the size of the health professional class by a small percentage at every institution, rather than to close entire schools and colleges." That method won't eliminate weakness or protect excellence, the report states. Urging policymakers in state governments and on medical school boards to "lead the way to closing entire schools and training programs, not lowering class size," the report says, "Such moves are the political equivalents of moving graveyards or closing military bases, but they are what is best for the nation."

Noting the rapid expansion of managed-care programs, the Pew report predicts that within "another decade 80-90 percent of the insured population of the US will receive its care through one of the systems." And it forecasts cataclysmic effects on staffing requirements, including: "closure of as many as half of the nation's hospitals and loss of perhaps 60 percent of hospital beds."

An accompanying effect, according to the report, will be "a surplus of 100,000 to 150,000 physicians, as the demand for speciality care shrinks; a surplus of 200,000 to 300,000 nurses generated as hospitals close; a surplus of 40,000 pharmacists as the dispensing function for drugs is automated and centralized."

By the year 2005, the report states, medical-school admissions should be reduced from the 1995 class size of 17,500 to 13,000 to 14,000, and the number of graduate medical-training positions should be only 10 percent above the number of US medical school graduates, with emphasis on family and internal medicine and general pediatrics.

To limit the number of foreign medical graduates, the report says the visa process should be changed to ensure that "they return to their native countries for service upon completion of training."

Give Priority to Youth

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science budgets, when I wanted to know, Bruce, where are you? And then I hear something said that suggests that he's talked to this person or that person on the Hill. I think his way of operating is sufficiently private that it's really hard to know what he's doing.

SGR. *The Republicans want to cut domestic federal spending by one third by the year 2002. Would that be bearable or calamitous?*

Singer. It would be calamitous for everything, not just for science. But there are also choices to be made, like the Space Station. If you took the $2 billion from the Space Station, it would make a very big difference. I don't think it's sufficient to say that you're cutting. You have to know where and how. When you say that, scientists immediately think that you're proposing that they make priorities among fields, because that's what sort of traditionally has been done. And they really don't want to do that, and for very good reasons. And I wouldn't want to do that. But there are other ways of setting priorities. For example, you could set your priorities on young people, and say, I'm going to give the bias to young people, rather than old, established people. You can set priorities for small, individual grants, as opposed to big, program grants. There are a lot of ways of setting priorities that have nothing to do with trying to make a bet on which field of science is the one that's going to succeed. Those kinds of priorities could be set. But there's nothing in the scientific community that makes me think there will be that kind of cooperation.

US, Foreign Firms Boost Global R&D Spending

Foreign firms are performing more research at facilities they own in the US, while American companies are cutting back on research in domestic facilities and spending more on research abroad.

That's the gist of a new report from the Commerce Department, *Globalizing Industrial Research and Development* (87 pp. no charge; order from: US Department of Commerce, Office of Technology Policy, Room 4814, 14th St. and Constitution Ave. NW, Washington, DC 20230; tel. 202/482-3037; fax 202/482-4817.)

The report doesn't directly address the increasingly sensitive political question in the US of export of high-paying employment to lower-wage nations, but some of the data suggest a strong trend in that direction.

In the 1987-93 period, research abroad by American-owned companies rose from $5.2 billion to $9.8 billion. Though the great bulk of the US R&D spending was concentrated in Germany, the UK, Canada, France, and other highly industrialized countries, the most rapid growth occurred in less-developed countries.

Between 1989 and 1993, the report states, US R&D spending increased from $134 million to $669 million in Ireland; from $90 million to $220 million in Brazil, and from $115 million to $321 million in Spain. US expenditures in Singapore rose from $25 million to $312 million.

On the other hand, the report shows that foreign-financed R&D activities in the US clearly account for a large and growing number of high-tech jobs.

Foreign-owned firms raised their R&D spending in the US from $6.7 billion in 1987 to $14.6 billion in 1993, employed 115,000 R&D workers, and accounted for more than 15 percent of the nation's company-financed R&D, according to the report. "Without the foreign spending in recent years," it states, "US company-funded R&D performed in the United States would have been stagnant or declined. Foreign funding of academic research and equipment purchases," it adds, "has been welcomed by university researchers in a period of declining federal funding."

The report was written by Donald H. Dalton, of the Commerce Department's Office of Business and Industrial Analysis, and Manuel G. Serapio Jr., Assistant Professor of Management and International Business, Graduate School of Business and Administration, University of Colorado, Denver.

Ozone Skeptic Fails to Support Suppression Charge

Rep. Dana Rohrabacher (R-Calif.), who says the ozone hole is a left-wing fabrication, expressed keen interest in September when a witness at a hearing said that scientific skeptics of the reported phenomenon are stifled and punished by the establishment.

The charge was made by Sallie Baliunas, a Senior Scientist at the George C. Marshall Institute, a conservative think tank in Washington, DC, during a hearing titled "Stratospheric Ozone: Myths and Realities." The setting was the House Science Committee's Energy and Environment Subcommittee, chaired by Rohrabacher [SGR, October 1]. Dissenters, she said, are denied grants and promotions.

Deeming the charges extremely serious, and promising a thorough investigation, Rohrabacher asked Baliunas to send him a letter "identifying the groups inside and outside of government that tried to stifle discussion."

The Congressman was back on the environmental trail on November 16, looking this time into another of his environmental interests, global change, which, he insists, is a political invention peddled by Vice President Al Gore.

During a break in that hearing, which ran on for five hours of pro and con testimony concerning the reliability of global-change models, SGR asked Rohrabacher how he was coming along in investigating Baliunas' charges.

The Congressman replied that she had informed him that, on advice of legal counsel, she would be unable to provide him with further information about stifling of ozone dissent. The reason she offered, Rohrabacher said, was that her information was obtained "during a coffee-break conversation." Her lawyer, Rohrabacher said, had told her that she could not prove the conversation had taken place, and she would therefore be vulnerable to a libel suit if she went public.

SGR pointed out to Rohrabacher that Congressional testimony in response to questioning is privileged and immune to legal action. He replied that he was not aware of that.

SGR tried without success to reach Baliunas by telephone.

The ozone and global-warming hearings are part of a broad inquiry Rohrabacher is conducting under the title of "Scientific Integrity and Public Trust: The Science Behind Federal Policy and Mandates."

Science Academy, AAAS Cut Staffs

Two big science organizations in Washington are trimming their staffs for economy purposes. The National Academy of Sciences is contracting out production of its venerable journal *Proceedings of the National Academy of Sciences* to Cadmus Journal Services, which produces many scholarly publications. Editorial control will remain with the NAS, but 28 staffers on the journal have been given notice,though some may be moved to other positions at the Academy.

At the American Association for the Advancement of Science, the Science and International Security Program has been abolished, resulting in 15 dismissals. The move was taken, the AAAS says, to avoid a looming deficit from lack of tenants in office space that the AAAS rents out.

In Print

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From the RAND Center for Information Revolution Analyses:

Universal Access to E-Mail: Feasibility and Societal Implications (MR-650-MF; 267 pp., $20), on the basis of a two-year study, concludes that it is doable and "imperative" to assure e-mail access at home for all Americans, including the financially needy, for whom subsidized service was estimated at a cost of up to $1 billion per year. Egalitarian access is described as essential for full participation in society. The Markle Foundation supported preparation of the report, written by Robert H. Anderson, Tora K. Bikson, Sally Ann Law, and Bridger M. Mitchell.

Order from: RAND Distribution Services, PO Box 2138, San Monica, Calif. 90407-2138; tel. 310/451-7002; fax 310/451-6915; Internet: order@rand.org

The full report is accessible on the World Wide Web: http://www.rand.org/publications/MR/MR650

From the Department of Education, National Institute on Postsecondary Education, Libraries, and Lifelong Learning:

The New College Course Map and Transcript Files: Changes in Course-Taking and Achievement, 1972-1993 (284 pp., no charge), finds from analyses of college transcripts that the "study of business and business-related fields now dominates postsecondary education. Even in non-business fields such as music and communications," the report notes, "we now see measurable student course-taking in 'The Business of X.' When this happens, students take fewer courses in other fields." The study found, however, that business studies require students to take more math. And, contrary to widespread belief, grade inflation has not increased, says the report, written by Clifford Adelman, of the Department of Education.

Order from: Department of Education, National Library of Education, CP-1, Room 101, 555 New Jersey Ave. NW, Washington, DC 20208-5721; tel. 1-800/424-1616.

From the National Institutes of Health, National Institute of Environmental Health Sciences (NIEHS):

Validation and Regulatory Acceptance of Toxicological Test Methods: A Report of the ad hoc Interagency Coordinating Committee on the Validation of Alternative Methods (85 pp., no charge), draft report of proposals, developed by NIEHS in collaboration with other federal agencies, for criteria for toxicological test methods, with emphasis on reducing or eliminating the use of laboratory animals. William Stokes of NIEHS co-chaired the interagency committee. A workshop based on the report will be held December 11-12 at the Crystal Gateway Marriott Hotel, Arlington, Va.

For copies of the draft report and information about the workshop: NTP Liaison Office, PO Box 12233, MD: A3-01, Research Triangle Park, North Carolina 27709; tel. 919/541-0530; fax 919/541-0295.

From the General Accounting Office (GAO):

Nuclear Safety: Concerns With Nuclear Facilities and Other Sources of Radiation in the Former Soviet Union (GAO/RCED-96-4; 41 pp., no charge), reports that in addition to 58 Soviet-designed power reactors in the former Soviet Union and eastern Europe, the defunct empire also harbors "at least 221 operating nuclear facilities," including plutonium processing and weapons-design plants, plus 10,000 to 20,000 organizations using radiation sources for medicine, industry, and research. Western specialists are concerned about safety standards, the GAO reports, noting that international aid aimed at the safety problem is fairly limited.

Order from: USGAO, PO Box 6015, Gaithersburg, Md. 20885-6015; tel. 202/512-6000; fax 301/258-4066.

From the National Science Foundation, Division of Science Resources Studies, no charge:

NSF Survey Instruments Used in Collecting Science and Engineering Resources Data (NSF 95-317; 305 pp.), copies of the scores of forms and questionnaires used in data collection by NSF, the principal source of statistics on R&D and related educational activities in the US. The surveyed topics include earned doctorates, graduate-school enrollments, research instruments in universities, R&D funding, and "public attitudes toward and understanding of science and technology."

Guide to NSF Science and Engineering Resources Data (NSF 95-318; 49 pp.), discusses the purposes, designs, sampling techniques, etc., for the NSF surveys, lists the publications that contain the data, and the NSF staff members involved in the studies. Carolyn F. Shettle is the principal author of the *Guide*.

Order from: National Science Foundation, Division of Science Resources Studies, Arlington, Va. 22230; tel. 703/306-1130; fax 703/644-4278; for instructions for electronic access: tel. 703/306-0214.

In Print

Official reports and other publications of special interest to the research community

(Copies of publications listed here are available from the indicated sources—not from SGR)

From the National Academy of Sciences (NAS), Committee on Japan:

Maximizing US Interests in Science and Technology Relations with Japan: Report of the Defense Task Force (126 pp., no charge), with lightly concealed exasperation, says past efforts have failed to prod Japan into reciprocating for science and technology acquired in the US. But the end of the Cold War and tight defense budgets necessitate progress toward balance, says the report, produced by the Committee on Japan's Defense Task Force, chaired by Gerald P. Dineen, former NAS Foreign Secretary. The report states that Japanese industry has used American-produced "know-how acquired through military programs to gain important footholds in certain high-technology commercial sectors such as aircraft and space, and has developed considerable strengths in a variety of commercial technologies with significant and growing defense applications." Recommended remedies tend to be gentle, ranging from a suggestion that Defense pay more attention to the problem, to another that would promote joint research projects on weapons-systems technologies. The study, financed by the Pentagon, is part of a broader review of US-Japan S&T relations mandated by Congress. Still to come from the Committee on Japan is a final report, supported by the Departments of Commerce, Energy, and State, and the National Science Foundation, on "an overall framework for maximizing US interests in science and technology relations with Japan."

A summary of the report is available on the Academy Web site: <http://www.nas.edu>. Printed supplies having run out, the Academy says it is contemplating, though has not yet decided on, another printing; in this uncertainty, orders are being accepted.

Order from: National Academy of Sciences, Office of Japan Affairs, 2101 Constitution Ave. NW, Washington, DC 20418; tel. 202/334-2815; fax 202/334-1748.

From the American Chemical Society (ACS), Task Force on the Study of Doctoral Education in Chemistry:

Employment Patterns of Recent Doctorates in Chemistry: Institutional Perspectives and Imperatives for Change (40 pp., no charge), more writhing over the low but nagging unemployment and underemployment in science and technology, this time in chemistry. The report responds to a 1994 ACS presidential colloquium which concluded that support for graduate chemistry education is spread thin over too many schools and that a reduction of smaller programs and redistribution of resources would, as stated in this report, "enhance the ability of the remaining programs to offer an excellent education." Not so, concluded the Task Force, chaired by David K. Lavallee, Provost, City College, New York. The big programs already get most of the federal support for chemistry, the Task Force found, and would not benefit from elimination or shrinkage of the smaller ones. The report contains tabular data on university chemistry departments, enrollments, federal funding, postdoc appointments, employment rates, immigration, etc.

Order from: American Chemical Society, Othmer Building, Room 220, 1155 16th St. NW, Washington, DC 20036; tel. 1/800-451-9190; fax 612/520-6706.

From the American Association for the Advancement of Science (AAAS):

AAAS Science and Technology Policy Yearbook (357 pp., $19.95 for AAAS members, $24.95 for others), consists mainly of papers delivered in Washington last April by senior government officials and academics at the annual AAAS Science and Technology Policy Colloquium, the big national gathering for mulling over science-policy issues. The collection includes a defense of Clinton R&D policies by John Gibbons, the President's Science and Technology Advisor, and an outline of Republican strategy for R&D, by Rep. Robert Walker (R-Pa.), Chairman of the House Science Committee. The volume was edited by Albert H. Teich, Stephen D. Nelson, and Celia McEnaney, of the AAAS Directorate for Science and Policy Programs.

Order from: American Association for the Advancement of Science, PO Box 521, Annapolis Junction, Md. 20701; tel. 1-800/222-7809; fax 301/206-9789.

From Gale Research, Inc.

International Research Centers Directory: Eighth Edition, 1996-97 (1674 pp., $430), lists over 8000 academic, industrial, and government research organizations—laboratories, institutes, support agencies, etc.—in some 180 countries, plus multi-national research organizations. Entries for each include address, phone and fax numbers, director's name, topics of research, library facilities, publications, etc.

Order from: Gale Research, Inc., 835 Penobscot Building, 645 Griswold St., Detroit, Michigan 48226; tel. 313/961-2242 or 1-800/877-4253; fax 313/961-6083.

From the British Library, Science Reference and Information Service:

Scientific Deception: An Overview and Guide to the Literature of Misconduct and Fraud in Scientific Research (107 pp., £24.50 in UK; $37.40 overseas, plus shipping), a wide-ranging, international review of 230 articles, books, and reports, compiled and discussed by Lesley Grayson, Editor of the British Library publication *Science, Technology and Innovation*. The major headings are "The Scientific Process," "Pressures on Scientists," and "Responses and Policy Implications" in the US, Europe, Australia, and other countries. A must for anyone interested in scientific crime, for whatever reason.

Order from: Turpin Distribution Services Ltd., Blackhorse Road, Lethworth, Herts SG6 1HN, United Kingdom; tel. (request British Library Section) 01462 672555; fax 01462 480947.

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